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Differences Between the Early Stages of the Unemployment Rates: The Great Recession vs. The Great Depression

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Abstract

We test for differences between the Great Recession and the Great Depression in the US, using unemployment rates. The test used is ANOVA. The hypothesis advanced is that the early phases of the recession and depression are non-different. At first we reject the hypothesis. But by incorporating government involvement for the two periods, we obtain moderate arguments for the acceptance of the hypothesis. The paper starts out with background ideas of the two periods, then proceeds to the testing based on actual data, deviation of actual from normal or NAIRU rates, and adjusted data for government capital injection and subsidies.

Key words: Depression; Recession; ANOVA; Capital injection; Subsidies

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INTRODUCTION

Testifying before the House Committee on Financial Services, HP-1279, on November 18, 2008, Treasury Secretary Henry M. Paulson, Jr. said “There is no playbook for responding to turmoil we have never faced.” In the same vein, writing in the op-ed column of the New York Times, Jan 4, 2009, the Nobel Laureate Paul Krugman wrote “This looks an awful lot like the beginning of a second Great Depression.”

In the Great Recession, “... long-term unemployment soared to levels not seen since the 1930s” and “the share of long-term unemployment (spells over 26 weeks) in total unemployment rose to over 45 percent, having never before topped 26 percent in postwar history” says Alan Blinder (2012, pp.136-137). From the statistical perspective, the analogy that the Nobel Laureate Christopher Sims’s made with fire in the kitchen puts our task at hand into perspective. He wrote:

On a typical day, the temperature rises while dinner is cooking and then falls. Suppose one day a fire started while dinner was being prepared and a fire extinguisher was used to put the fire out. The time path of temperature in the kitchen would look relatively normal, but it would be incorrect to say nothing unusual had happened, because had the fire extinguisher not been used, the temperature in the kitchen would have developed very differently that evening. (Sims, in Stock and Watson, 2012, pp.134-135)

Following Sims’s perspective, we may liken the use of the fire extinguisher to the early efforts of policy makers to extinguish the current financial crisis. The purpose of this paper is to compare the attempts of Presidents Hoover and Roosevelt administrations to extinguish the liquidity crises of the early phase of the Great Depression with that of Presidents Bush and Obama administrations to extinguish the problems of the Great Recession.

The crisis of stagflation in the 1970s bequeathed to us three kinds of macroeconomic windows to look at the two periods. President Nixon was accommodating inflation when he increased the money supply to counteract OPEC supply shock in the early 1970’s. His successor, President Ford, adopted a neutral policy when the second round of OPEC occurred in the mid-1970s. President Carter followed President Nixon’s policy at the end of the 1970s, accommodating another round of OPEC shocks. It was the bold monetary policy of President Reagan in the early 1980s that induced a recession to extinguish the double digit inflation rate, and his bipartisan fiscal policy package of cutting both business and personal income tax rates to induce the economy growth afterwards, which dominated

macroeconomic policies in subsequent crises. We shall have occasions to use the extinguishing, accommodating and neutral policy views to characterize the different policies between the recession and depression sample periods in this study.

1. SYNOPSIS OF THE GREAT DEPRESSION POLICIES

The October 29, 1929 stock market crash had occurred seven months after President Herbert Clark Hoover took office (Hoover, 1952, p.19). The president squarely sourced the cause of the depression to “finance—which has failed and produced by far the largest part of the demoralization of our systems of production and distribution” (ibid., p.25). He did not take to a “leave it alone liquidationists” approach as is customary for free marketers, but sided with those who would “use the powers of government to cushion the situation” (ibid., pp.30-31). This seems at best to be an accommodating rather than an extinguishing policy. He cushioned the landing by annual labor and public works expenditures for the period 1929 to 1932 with the expenditure of \$356.5, \$410.4, \$574.87, and \$655.88 million, respectively. In his four years term, his administration had “expended more than \$2,380,000,000 on public works” (ibid., p.450). The administration stopped the subsidies because it found that useful works of this type were about exhausted. Some economists have daubed President Hoover’s efforts the “Hoover New Deal”. “Hoover must be considered the founder of the New Deal in America. Hoover, from the very start of the depression, set his course unerringly toward the violation of all the *laissez-faire* canons” (Rothbard, 1963, p.168).

On March 4, 1933, President Roosevelt kicked off his inaugural speech with primary interest for the domestic economy, and only a “good neighbor policy” for international affairs (Roosevelt, 1969, Vol.1, pp.19-20). In his April 19, 1933 press conference, the President announced an embargo on the export of gold—coins, bullions, and certificates, which was put into effect the next day (ibid., p.61). By April 26, 1933, he announced two policy goals: stabilization of currency and stabilization of the market, but realized that those policies were “a pair of dice” (ibid., p.76). He also was struggling with resolutions in relation to tariffs and debts on the foreign front and railroad building on the domestic front (ibid., p.76). A program for public works was before Congress (ibid., p.144). The president later had to assure Congress that “the building of the St. Lawrence Seaway will not harm the railroads or throw their employees out of work; that it will not in any way interfere with the proper use of the Mississippi River or the Missouri River for navigation” (ibid., p.584).

President Roosevelt signed the Banking Act of 1933 on June 16, 1933. In that act, the Federal Deposit Insurance Corporation (FDIC) was only a temporary corporation, which was later to be made permanent by the Banking

Act of 1936. The FDIC was a milestone in stopping runs on banks. Its major function was to “guarantee banks up to \$2,500. When the law came up for extension in 1934, the House Banking and Currency Committee under the chairmanship of Steagall was leaning towards...\$10,000. The Senate and House finally agreed on the compromise figure of \$5,000” (Roosevelt, 1950, p.395). The coverage of the FDIC was seen as a major instrument for the stabilization of banks in the Great Recession, when the limit was expanded to \$250,000 in January 2013.

As of mid-1933 nothing firm was done on tariffs and debts (ibid., p.194). Regarding foreign debt, the president’s position was that each nation owing the US should submit individual proposals about their repayment plans (ibid., p.208). By October 1933, the president was determined “... to enable agriculture and industry once more to give work to the unemployed.” The procedure was to inflate gold prices by fixing the dollar to gold, and allowing the Reconstruction Finance Corporation (RFC) to buy gold at a higher price (ibid., pp.435- 436). Progress on the stability of currency was slow. On the domestic front, the National Industrial Recovery Act was passed in June 1933, which had broadly defined for industry “what the hours of work should be” (ibid., p.276). On the foreign front, by the end of 1933 the President characterized the problem as follows: “...we wonder when we wake up in the morning where the Pound and the Franc & other currencies are going to go in the course of the day” (ibid., p.518).

Roosevelt (1950, p.382) called the year 1934 the year of “The Advance of Recovery and Reform.” Inflating the dollar was a top priority. “The RFC and Treasury would have quite a large sum in gold on the other side—London and Paris” (Roosevelt, 1969, Vol.1, p.627). Instead of using helicopters to drop the gold at homes in the style of Milton Friedman dropping dollars bills on the streets, it was proposed to bring the gold by naval vessel. What was significant is that the monetary transmission mechanism would come into play to stop deflation, which was a result of falling farm prices. The view of the administration is captured by the following quote:

Dean Acheson of the Treasury, and Henry Morgenthau, Jr., then of the Farm Credit Administration, set the price at which gold was purchased. The first price set was \$31.36 an ounce equivalent to a 66-cent dollar. By January 31, 1934, the government was buying gold at \$35 an ounce, which meant the dollar had been devalued to 59.06 cents, the figure at which it was pegged. (Roosevelt, 1950, p.366)

In 1934 The Gold Reserve Act was enacted “...as a step in improving our financial and monetary system” (Roosevelt, Vol.2, p.116-117). The inflow of gold would increase the money supply, lower the interest rate and stimulate investment, creating a multiplier effect on GDP. (Romer, 1992, p.782). Regarding debt, an assessment was made for the first time in 1934 that over the preceding 38 year, the world owed the U.S. approximately \$22 Billion, but repayment was a big issue (Roosevelt, 1969, Vol.2,

p.153). By October 1934, the set of goals the president contemplated seem to lack the instruments to achieve them, and were characterized as “Fat Hopes,” based on US demands, British demands, and Japanese parity, according to a cartoon portrayal (ibid., Vol.2, p.237).

2. SYNOPSIS OF THE GREAT RECESSION POLICIES

The Great Recession started in the fall of 2007. A National Commission Inquiry Report (NCIR) casts its findings in some stylized facts—the crisis was avoidable; corporate governance and risk management failed; financial institution engaged in excessive borrowing and risky investment; the government was ill prepared to handle the situation; there was a breakdown of accountability and ethics; contagion was upon mortgage lending and security activities; over-the-counter derivative collapse, and credit rating was mismanaged (NCIR, 2011, pp.xvii-xxviii).

At the inception, the FED discount window could not provide the liquidity the financial institutions needed. (ibid., p.274). A year later on October 3, 2008, President George W. Bush signed the Troubled Asset Relief Program (TARP) into law. It appears to be a repeat of the RFC introduced in 1932 by the Hoover administration only that TARP happened within a year of the initial crisis. The RFC bailed out distressed banks, and bought stocks in approximately 6,000 banks to the extent of \$1.3 billion estimated to be worth about \$200B in today’s value, much smaller compared with TARP. (See New York Times, October 14, 2008, *Intervention Is Bold, but Has a Basis in History* by Steve Lohr) TARP was authorized for the spending of \$700 Billion. In the next quarter, on February 17, 2009, President Obama signed The American Recovery and Reinvestment Act of 2009 (ARRA) authorized to spend \$787 Billion. Both TARP and ARRA funds were disbursed in installments and had some multiplier effect on GDP and employment (CEA Report, 2009).

The national debt at the end of President Bush term (2008) was \$10,024 billion, compared with \$16,066 billion by the end of President Obama first term (2013). As a percentage of GDP they are 68.1 and 98.9 percent, respectively. They are approximately twice the percentages of debt to nominal GDP carried by the Hoover and Roosevelt administration. This comparison underscores the point of our investigation that the Great Recession was treated with more lavish government expenditures than the Great Depression. Table 1 below places the figures side-by-side.

Table 1
Government Debt for the Sample Periods

Presidents	Terms	Dates	Nominal GDP \$B	Debt \$B	Percentage of GDP
Hoover	1929-1932	1932	59.5	22.5	37.82
Roosevelt	1933-1936	1936	84.9	38.3	45.11
Bush	2001-2008	9/08	14,720.3	10,024	68.10
Obama	2009	9/12	16,244.6	16,066	98.90

Sources: Debt: <http://www.treasurydirect.gov/govt/reports/pd/histdebt/>

histdebt_histo5.htm
 GDP: <http://bea.gov/national/index.htm#gdp>

This paper leans on the premise that TARP and ARRA blocked the current recession from turning into a depression as is represented by Blinder and Krugman ideas above. We examine the hypothesis that without such blockings, the early stages of the depression and the recession as manifested by the unusually high unemployment rates would take the form of a non-different null hypothesis.

Economic analysis for the early phases of the Great Depression is scanty. A dominant theme in the literature is the recovery period which is dated from 1934 to World War II. Such analysis of the business cycle is notoriously divided into two schools of thought. Basically, we find Keynesians focusing on the fiscal side and the monetarists on the financial side of the recovery. Some empirical studies which include that of Brown (1956), Romer (1992), De Long and Summers (1988), and Vernon (1994) represent the Keynesian side. Essentially, this article is different in that it addresses only the early phases of the Depression and Recession. It brings in statistical considerations to appraise the differences between the early phases of the Great Depression and the current Great Recession.

To spotlight the government’s impact on the depression, we highlight Samuelson’s dictum that “... it is a myth which will not die that deficit financing was tried in the 1930s and was found to failed, that it took the Second World War to bring back prosperity.” (Samuelson, 1986, p.276) For our sample period, E. C. Brown documented that government fiscal impact at federal state and local levels were higher in 1930s for the years 1931 and 1936. (Brown, 1956, p.863) As if to complement this argument, Christina Romer argued that the influx of gold created a monetary impact that also had a multiplier impact on the economy. (Romer, 1992)

3. STATISTICAL MODEL

We test a statistical model that explains and predicts variations of unemployment rates for the two crises phenomena of the Great Depression and the Great Recession. The specification of the mode is as follows:

$$Model: y_{ij} = \eta + \tau_j + e_{ij}$$

The first term on the right hand side is the grand mean, the second term is the treatment, and the last is the error term. The model assumes that the observations are independent and normally distributed with mean zero, and constant variance.

As with economists, statisticians too are divided into schools of thought. We are referring to the frequency, and the Bayesians schools of thought. The latter are looking for causes. We see it in many forms in the media. Does high debt to GDP ratio lower growth? Can cycles be caused by problems with the money supply

for the monetarists, the lack of consumption for the Keynesians, or the interaction between the multiplier and the accelerator according to the neoclassical synthesis? Our investigation is more about resemblance relationships than with a causal explanation, and is therefore, leaning more to the frequency theory approach of statistics. It contrasts with the Bayesians analysis where if it is given that we have drawn a red ball from K-urns, we would ask what is the probability that it came from a particular urn? Bayesian analysts look for causes.

The financial Quants have sourced the Great Recession to many causes. A short list of these ideas would include the following:

- Benoit B. Mandelbrot's (1997) idea of "fat tails" that has been particularly used against the Variance at Risk concept of managing loss. It is now argued that a Generalized Extreme Value Distribution rather than a Normal Distribution should be used in financial forecasting. (Herzog & Turc, 2011, p.21)
- Nassim Nicholas Taleb's (2005, 2007) two pronged ideas that we are being "Fooled by Randomness" and that there exist "Black Swans" that can put down a good syllogism.
- Emanuel Derman (2011), a former Wall Street Quant leans on intuition over theories and models. For instance, in forecasting risk with decision trees we do not allow the branches of the tree to be closing towards the expected value. But intuitively we know that the principal on a discount bond will be paid back at maturity.
- George A. Akerlof and Robert J Shiller's (2009) ideas to resuscitate Keynes's Animal Spirit behavior in lieu of rational view in modern investment theory.

All these ideas seek to explain the current Great Recession. As we indicated above, we wish to add to this search a resemblance view of the current recession with the early stages of the Great Depression. Our study takes the foundation of a simple statistical explanation of the difference between the incidents of unemployment rates during the two phenomenal occurrences. We have decided to look at the unemployment data that has now become available to start testing the unemployment rates during the early stages of the Great Recession and the Great Depression. While the test does not establish causality, it is designed to explain whether government capital injection and subsidies make a difference.

4. DATA

Unemployment rates for the Great Depression are readily available. Sample size is constrained by temporality of the early phases of the recession and the depression. We must make explicit the date of the sample period. The start of the recession and depression are taken as 2007 and 1929 respectively. It is by chance that they happened in the fall of those years. It is also a coincident that both the beginning and end periods were bracketed by Republican and Democratic presidents-Presidents Hoover

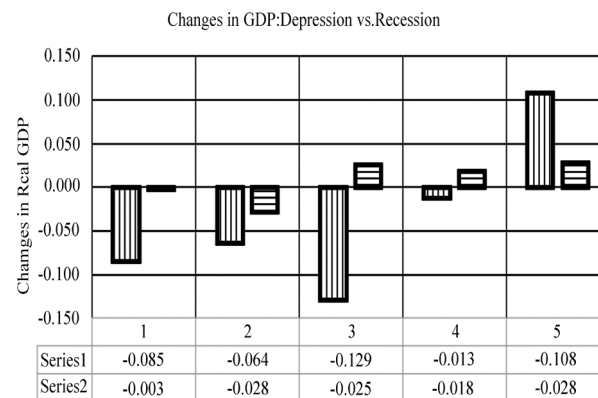
and Roosevelt for the Depression and Presidents Bush and Obama for the Recession. One major difference between the two periods, however, is that subsidies and stimuli were not present in the early depression period, but were almost hurriedly assembled for the recession. Policy makers have learned from the depression how to treat the recession. In fact, the media boasted about how the secretary of the FED was a scholar of the Great Depression.

As of the date of this analysis, the U S Bureau of Labor and Statistics has released unadjusted unemployment rates from 2007 to 2012. The matching data for the Depression would be for the years 1929 to 1934. The recession data we use is taken from Smiley (1983, p.488). This is essentially the data that Robert Lucas Jr. (1981, p.62) used to test his Rational Expectation hypothesis. Michael Darby (1976, p.5) adjusted the depression data in 1933 and 1934 downward to reflect persons on work relief programs that were not counted as employed by the Bureau of Census at that time. We will see that this is not an insignificant adjustment from our analysis in Table 4 below. Table 2 below presents the unemployment data for the Depression and Recession periods under study.

Table 2
Early Recession vs. Early Depression Unemployment Rates: Actual vs. Natural Rates

	Great recession		Great depression	
	Actual rates	Natural rates	Actual rates	Natural rates
2007 vs. 1929	4.6	5.00	3.2	4.5
2008 vs. 1930	5.8	5.07	8.7	4.5
2009 vs. 1931	9.3	5.23	15.9	4.5
2010 vs. 1932	9.6	5.43	23.6	4.6
2011 vs. 1933	8.9	5.50	24.9	4.6
2012 vs. 1934	8.7	5.50	21.7	4.6
Mean	7.82	5.29	16.33	4.55
Variances	4.35	0.05	77.17	00

Sources: Recession rates are from BLS and Depression Rates are from Smiley (1983, p.488). Natural Recession Rates are from CBO and Natural Depressions Rates are from Robert R. Gordon Robert R. Gordon, Macroeconomics, Pearson (1990, p.A2).



Depression Years 1929-1933vs.Recession Years 2007-2012

Figure 1
Changes in GDP: Depression vs. Recession

The period from 1929 to 1933 witnessed the most precipitous fall in GDP growth rate for the whole

depression period from 1927 to 1942 (Romer, 1994, p.760). Figure 1 below indicates that real GDP declined only during the first two years of the Recession (Series 2) and turned around in the third year while the Depression lingered four years in a row (Series 1). (Source: U.S. Bureau of Economic Analysis, National Income and Product Accounts). Figure 1 clearly shows larger decline in GDP growth rates in the depression phase of the cycle.

5. RESULTS AND DISCUSSIONS

The variance of the depression rates is about 19 times higher than that of the recession rate. This casts a doubt about the homogeneity of the variances. With 6 observations, one may be able to tolerate a variance of 7 times as large as the other for a t-test (Iversen & Norpoth, 1976, p.16).

One usually employs a t-test for the analysis two means. The position taken here is that the t-test is a special case of an Analysis of Variance (ANOVA), which enters the statistical toolkit for the testing of two or more means (Snedecor, 1956, p.256). "When two treatment levels are used, the statistical test employed in the analysis is equivalent to a test by means of a t ratio for uncorrelated groups" (Kirk, 1968, p.13). The "F test is easier to perform than the t" (Snedecor, 1956, p.257). For those reasons and in particular because we would be concerned with

blocking out capital injection and subsidies from the data, we decided to proceed with ANOVA rather than the t-test.

In our analysis, treatment refers to the two independent samples of unemployment rates in Table 2 above. Table 3 shows the results for the components of the model we described above. Each estimate of the model is cast in terms of sum of squares which corresponds to each of the model parameters. The sum of squares and degrees of freedom of the model can be listed as follows:

Table 3
Sum of Squares

	y_{ij}	η	τ_j	e_{ij}
Sum of Squares	2,374.95	1,749.67	217.60	407.68
Degrees of Freedom	12	1	1	10

The ANOVA results in Table 4 below gives an F-value greater than the F-Critical value. The model has two estimates of variances--The Within Group vs. The Between Groups estimates. The latter estimate (217.60) of the variance is conditioned on the null hypothesis that the treatment is zero. Because the F-value > F-Critical value, we reject that null hypothesis. Therefore, we reached the conclusion that the influence of TARP and other subsidies have had a significant influence on variation of unemployment rates during the Great Recession so as to render a mean difference from the Great Depression unemployment rates.

Table 4
ANOVA for Unemployment Rates in Table 2

Groups	Count	Sum	Average	Variance		
Recession 1	6	46.9	7.82	4.35		
Depression 2	6	98	16.33	77.19		
Source of Variation	SS	Df	MS	F	P-value	F critical
Between Groups	217.60	1	217.60	5.34	0.04	4.96
Within Groups	407.68	10	40.77			
Total	625.28	11				

5.1 Natural Rate Adjustments

The prominent concern that there exists a natural rate of unemployment calls for adjustments to be made in the comparison. Economists have popularized this natural unemployment rate view as NAIRU—nonaccelerating inflation rate of unemployment. This estimate of the NAIRU rate had been uncertain. It involves the inflation rate and as Lucas Jr. puts it "...one would like to know what the average rate of unemployment would have prevailed since World War II in the United States had M1 grown at 4 percent per year during this period, other policies being as they were," (Lucas, 1994, p.288) This issue is reminiscent of Milton Friedman's (1963, p.299) position that the Great Depression was due to monetary causes. For Friedman and Schwartz, the period 1929-1933 was the period of "The Great Contraction" of the money supply. Paul Krugman (2007) has pointed out that the money base increased from \$6.05 billion in 1929 to

\$7.02 billion in 1933, while the money supply fell from \$26.6 billion to \$19.9 billion, reflecting bank failures. Friedman's position remains that the Fed failed to meet the needed liquidity of the banks.

Another point about NAIRU is that it drifts upward with unemployment benefits. As Samuelson puts it: The "...natural rates of unemployment had become ethically unnatural because of the ever-weighted transfer-welfare programs of Scandinavian, Dutch, British, and North American Societies" (Samuelson 2011, p.312). In the more modern labor market view, unemployment benefits create a difference between wage-setting and price-setting curves. Increased benefits make unemployment a lesser disutility, creates a situation of a higher real wage, which requires a higher unemployment rate to harmonize real wages and what firms are willing to pay.

This phenomenon was daubed a “discipline device” for unemployment (Blanchard, 2006, p.131) .

Table 5
ANOVA Using Darby’s Work Relief Data for 1933 and 1934

Groups	Count	Sum	Average	Variance		
Recession 1	6	46.9	7.82	4.35		
Depression 2	6	88	14.67	57.08		
Source of variation	SS	Df	MS	F	P-value	F critical
Between groups	140.77	1	140.77	4.58	0.06	4.96
Within groups	307.14	10	30.71			
Total	447.91	11				

John Maynard Keynes held the view that “a progressive increase in unemployment will usually force the State to provide relief out of borrowed funds” (Keynes, 1936, p.251). This idea is very much present in the two sample periods we are discussing. For the Great Depression, Michael Darby (1976) made adjustments to the unemployment rate to reflect unemployment relief. He lowered the 1933 rate from 24.9 to 20.6, and the 1934 rate from 21.7 to 16.0. To see if this makes a difference between the two periods, we re-run the ANOVA test for Darby’s correction for the two years. Table 5 below shows the results. It turned out that one can no longer reject the null hypothesis that government treatment is ineffective, namely, that in the model. The F-value, 4.58, is now less than the F-critical, 4.96.

5.2 Actual vs. Natural Rates of Unemployment

The above analysis takes into consideration only work relief programs. Further adjustment to the data can be made to take account of the NAIRU effect. This analysis will take the form of a deviation of the actual unemployment rate from the natural rate. The problem at hand is to come up with a reasonable estimate of the natural rate. The Nobel Laureate Robert Solow prefers to call it the “neutral” rate. (Solow and Taylor, 1999, p.5)

In this section we test the deviation of unemployment rates from their normal rates. This means that we have to come up with natural rate estimates for the two samples. Robert R. Gordon (1990, p.A2) estimated that the natural rate of unemployment in the depression increased from

for each year is then subtracted from each observation. Table 7 gives the results of this blocking test.

Table 7
Results for Blocking Out Treatments Such as Government Subsidies on the Differences Between the Great Recession and the Great Depression

f-test	Treatment statistics	Block statistics	Treatment effects	Block effects
Actual data w/out Darby’s corrections	9.08 ($\rho = 0.15$)	2.40 ($\rho = 0.18$)	No evidence against the null hypothesis.	Little or no evidence against the Null Hypothesis.
With darby’s corrections	8.88 ($\rho = 0.02$)	2.87 ($\rho = 0.15$)	Moderate evidence against the null hypothesis.	Little or no evidence against the null hypothesis.
Actual vs. normal w/out Darby	10.22 ($\rho = 0.12$)	2.18 ($\rho = 0.20$)	Same as above	Same as above
Actual vs. normal with darby	10.34 ($\rho = 0.01$)	2.60 ($\rho = 0.17$)	Same as above	Same as above

4.5 in 1929 to 4.6 in 1934, a fairly constant rate. For the recession, the CBO estimated the natural rate of unemployment increased from 5.07 in 2008 to 5.5 in 2012. (U.S. Congress: Congressional Budget Office, 2013).

As a preview of the difficulty of the matter at hand, we open the analysis in this section with a χ^2 test. For this purpose, we use the normal level of employment as a natural candidate for the expected level. The null-hypothesis of the χ^2 test is between the actual and the natural or expected data of Table 2. The test reveals χ^2 values of 10.47 for the recession data, and 264.81 for the depression data. The critical value at the 95 percent level is 11.07. The conclusion is conflicting for the two periods: The recession data is pointing towards the acceptance of the null hypothesis that the differences are due to chance, while the depression data is pointing towards the rejection of the null hypothesis.

We next subject the data to an F-test, using the deviations of the actual from the natural rates. Using the deviated data, Table 6 indicates that the F-value of 6.43 exceed the F-Critical of 4.96 at the 95 percent level. When the Darby correction data was used for the two years 1933 and 1934, the F-value was 5.75 and the F-Critical was 4.96. In both cases, we failed to reject the null hypothesis of non-difference. We do observe, however, that in the initial years of both periods the economy was operating beyond full employment. Leaving out the years, namely 1929 and 2007 leads to even stronger results for rejecting the null hypothesis.

Table 6
F-Tests for Deviation of Actual vs. Natural Rates of Unemployment

f-test	f-values	f-critical	Null hypothesis
Full 6 year periods	6.43	4.96	Reject
Darby Corrections	5.75	4.96	Reject
Drop Initial Years	13.84	5.32	Reject
Darby Corrections	12.91	5.32	Reject

5.3 Blocking and Treatment Effects

The question arises as to whether one can block out the TARP, RFC and subsidies in the two series. This requires us to change the model by adding another term to the treatment parameter. Our model will now be $y_{ij} = \eta + \beta + \tau_j + e_{ij}$. The new term β is estimated as the average of each year’s observation less the grand mean, namely, $\bar{y}_i - \bar{y}$. The estimated values of β

Table 8
ANOVA: Two-Factor Without Replication

Summary	Count	Sum	Average	Variance
Row 1	2	7.8	3.9	0.98
Row 2	2	14.5	7.25	4.205
Row 3	2	25.2	12.6	21.78
Row 4	2	33.2	16.6	98
Row 5	2	33.8	16.9	128
Row 6	2	30.4	15.2	84.5
Column 1	6	46.9	7.816667	4.349667
Column 2	6	98	16.333333	77.18667
ANOVA				
Source of variation	SS	Df	MS	F
Rows	287.8175	5	57.5635	2.401197
Columns	217.6008	1	217.6008	9.076976
Error	119.8642	5	23.97283	
Total	625.2825	11		

Each result of Table 7 is nothing more than a two way ANNOVA without replication test. The complete run for the first entry is given in Table 8 below. The other three runs are reported in condensed form only in Table 7.

The results of Table 7 indicate that attempts to block out work relief and government subsidies effects on the unemployment rates for the two periods do not reject the null hypothesis of equality of the variances overall. The results for the Darby corrected data, and NAIRU adjustment render some moderate support to reject the equality concept of the null hypothesis. The underlying theory is that had the government not been involved in the crises the different variations between the recession and depression rates would be similar seem to be tenable.

CONCLUSION

In this study, the conclusion on whether to accept or reject the null hypothesis of non-difference between the early stages of the recession and depression has zigzagged quite a bit. When purely statistical matters are considered, a rejection is possible, but when economic meaning in terms of NAIRU and Subsidies are integrated into the test, an acceptance is possible.

A straightforward ANOVA test between the actual unemployment data for the two samples leads to a rejection of the null hypothesis. The tug-of-war of the Between and the Within sum of squares would lead to a rejection of the null hypothesis that parameter in the ANOVA model is non-different for the two periods.

We then followed the economic train of thought, making a correction for work relief subsidies for the years 1933 and 1934 in line with Michael Darby re-estimate of the unemployment rates. The results lead to the acceptance of equality of the variances between two periods. We are led to the notion that the beginning of the two periods share similar characteristics even though the Bush and Obama administrations have had an early start in the injection of capital and subsidies to extinguish the downswing of the recession, and the Hoover and Roosevelt administrations have done so in a lagged manner for the depression.

Ratcheting up the economics concept to bring in the NAIRU theory in macroeconomics, the results again began to swing. The NAIRU view has not led to the acceptance of the null hypothesis in the two instances we examined. One may say it rejects the null hypothesis, taking us back to the first, purely statistical results. One only needs to do a surface research, however, on the NAIRU hypothesis to find that it is controversial. First, it was supposed to replace Friedman's 1978 Natural Rate Hypothesis with the Keynesian perspective developed by Tobin and Modigliani. (Szenberg & Ramrattan, 2008, p.148) Second, there is much controversy on whether the latter period natural rate are higher or lower than the depression periods. Arguments abound in the area of the changing structure of the labor force due to the entry of women, younger people, and baby boomers that may underline the argument that the NAIRU is higher. Others have pointed out that while it was higher in the 60s and 70s, it has become lower in recent years.

A final statistical test resorted to blocking, that is an attempt to block out the influence of government actions in the nature of RFC vs. TARP, and subsidies program between the two periods. The analysis is statistical, relying on a two-factor ANOVA where column comparisons are made only after row differences are eliminated. The blocking results for the Darby and NAIRU data show some moderate evidence against the null hypothesis.

Adding up our results give moderate evidence that lead to the common notion that had the government not been involved in the current recession, the results could have been much worse. Because the evidence is only moderate, one cannot select the policy choice of one particular school over another. One has to be scientifically honest in further research by building structural models of the economy and subject them to the data. Meanwhile, we can state that the policy makers that took controversial stances, such as the Treasury Secretary Paulson, Jr. and the FED Chairman Bernanke were being pragmatic when it was in their hand to save capitalism. We would have liked to take the position with Keynes that probability does not matter, and join with others who are eager to render macroeconomics a non-ergodic discipline. But as we have seen, the blend of economic ideas with statistics can create an opening to look into economic matters, if only to find out that the statistical results moderately underscore pragmatic thinking that the government should be involved to resolve economic crises.

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